

# LW/MW/FM STEREO RECEIVER

## MODEL NO. AX-S50E,K

# AIWA®

## [SERVICE MANUAL]

Code No. 06-500-000-18



DATE OF ISSUE 10/1980

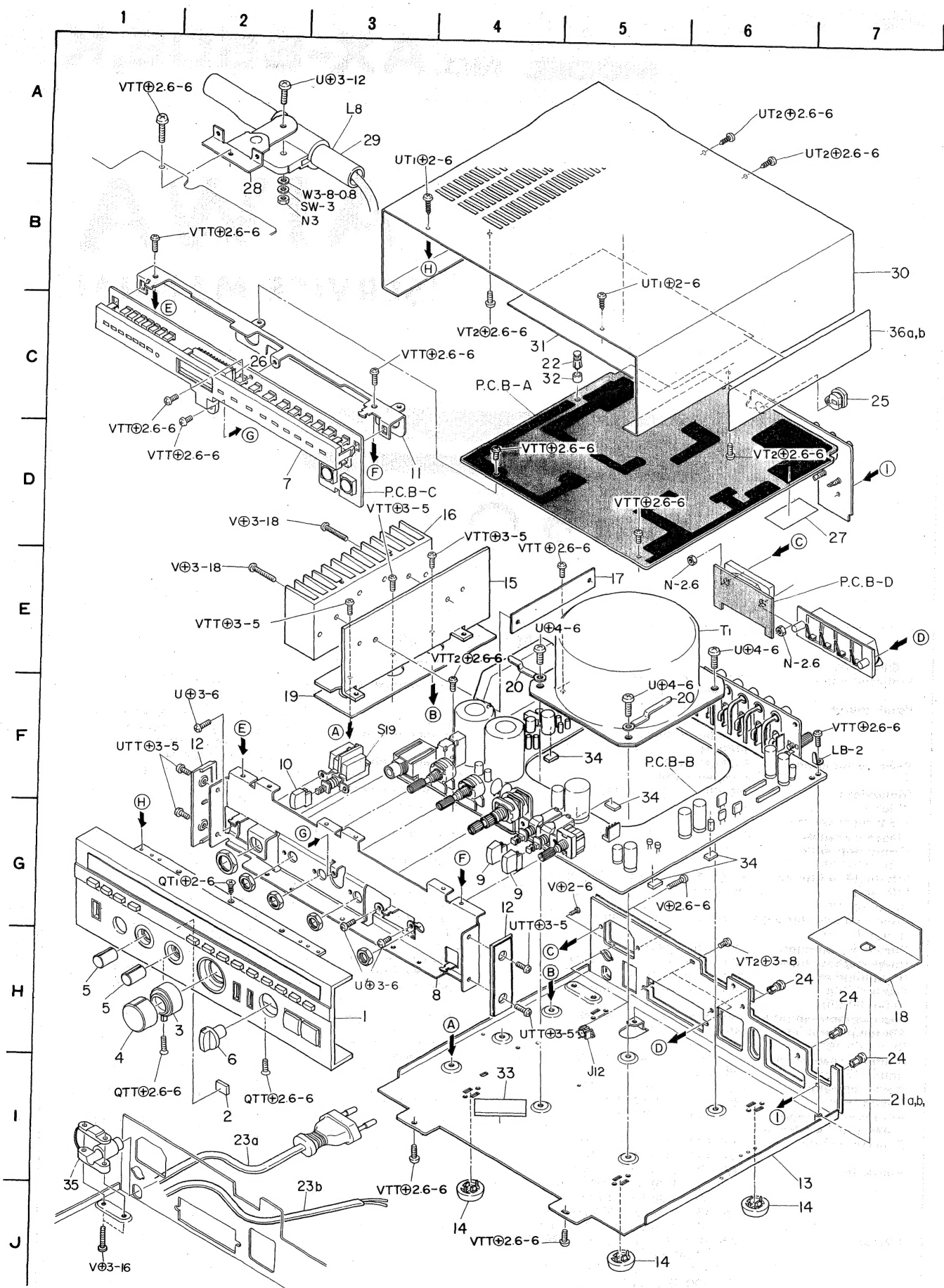
### SPECIFICATIONS

#### < GENERAL >

<b>Semiconductors:</b>	16 IC's, 4 FET's, 56 transistors, 69 diodes, 18 LED's
<b>Power source:</b>	E model AC 220V 50/60 Hz K model AC 240V 50/60 Hz
<b>Power consumption:</b>	E model 150W K model 140W
<b>Dimensions:</b>	250(W) x 71(H) x 316(D) mm
<b>Weight:</b>	3.6 kg
<b>&lt; FM tuner section &gt;</b>	
<b>Frequency range:</b>	87.5 MHz to 108.0 MHz
<b>Usable sensitivity:</b> (IHF, THD 3%)	Less than 10 dB (at 88, 98, 107.5 MHz)
<b>S/N 26 dB sensitivity:</b>	4 ± 3 dB (at 88, 98, 107.5 MHz)
<b>S/N ratio:</b> (Input 60 dB)	More than 60 dB (at 88, 98, 107.5 MHz)
<b>Total harmonic distortion:</b> (Input 60 dB)	Less than 0.2% (at 98 MHz)
<b>Frequency response:</b>	30 Hz to 15,000 Hz
<b>Image response ratio:</b>	More than 65 dB (at 98 MHz)
<b>IF response ratio:</b>	More than 70 dB (at 98 MHz)
<b>Capture ratio:</b> (Input 60 dB)	Less than 2 dB (at 98 MHz)
<b>Spurious response ratio:</b>	More than 80 dB (at 98 MHz)
<b>AM suppression ratio:</b> (Input 40 dB)	More than 45 dB (at 98 MHz)
<b>Alternate channel selectivity:</b> (Input 40 dB)	More than 50 dB (at 98 MHz, ±400 Hz)
<b>Stereo separation:</b>	More than 37 dB (at 98 MHz)
<b>Muting level:</b>	25 ± 6 dB (at 98 MHz)
<b>Auto scan stop level:</b>	25 ± 6 dB (at 98 MHz)
<b>&lt; AM Tuner section &gt;</b>	
<b>Frequency range:</b>	MW 522 kHz to 1,611 kHz LW 145 kHz to 350 kHz
<b>Sensitivity:</b>	MW 53 ± 4 dB (at 603 kHz) 53 ± 4 dB (at 1,008 kHz) 53 ± 4 dB (at 1,413 kHz) LW 65 ± 4 dB (at 160 kHz) 62 ± 4 dB (at 200,350 kHz)
<b>S/N ratio:</b>	MW More than 33 dB (at 1,008 kHz, 74 dB input) More than 40 dB (at 1,008 kHz, 100 dB input) LW More than 35 dB (at 200 kHz, 80 dB input) More than 40 dB (at 200 kHz, 104 dB input)

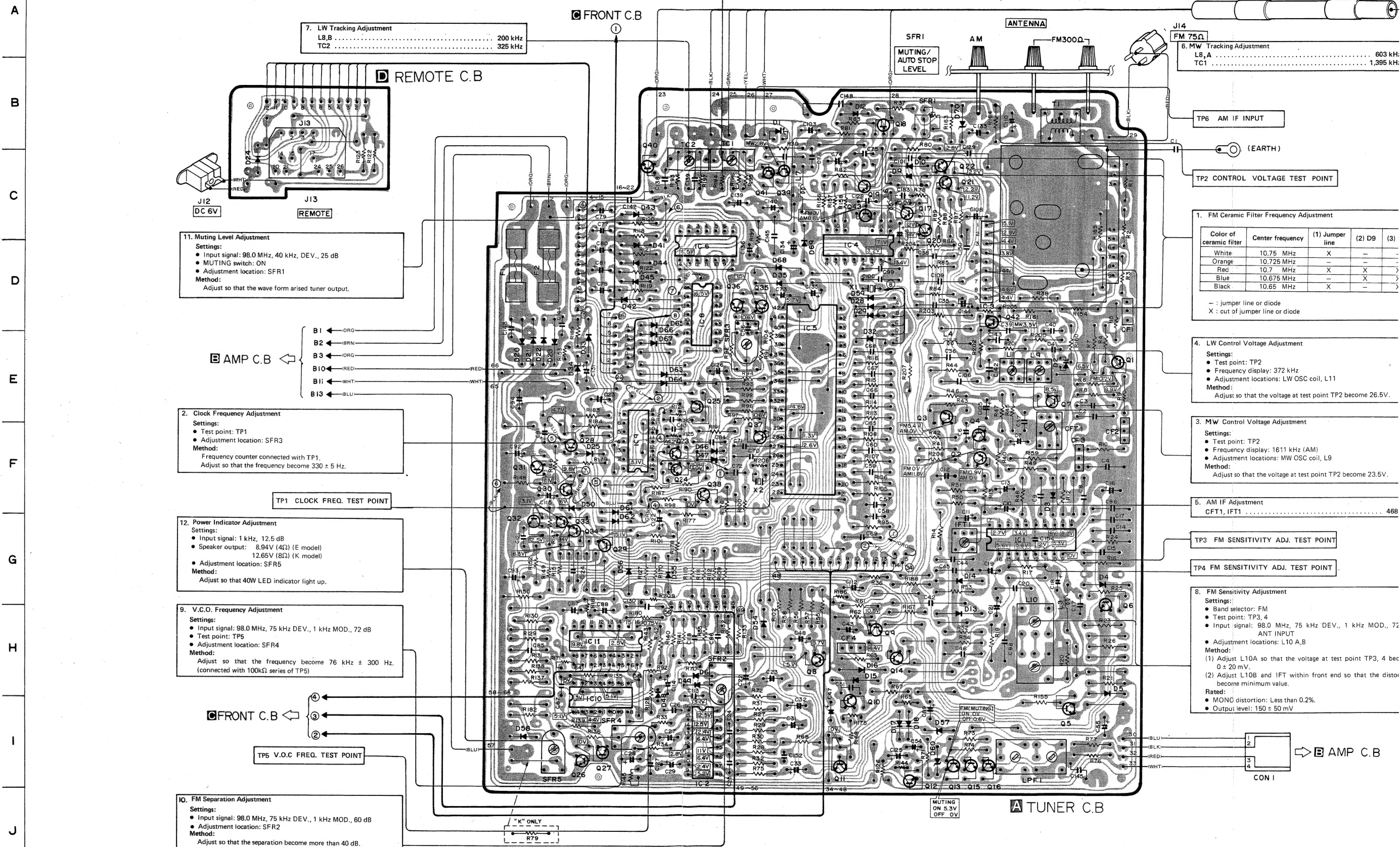
<b>Total harmonic distortion:</b>	MW Less than 1.3% (at 1,008 kHz)
<b>Image response ratio:</b>	MW 45 <sup>+10</sup> <sub>-5</sub> dB (at 1,008 kHz) LW 44 ± 5 dB (at 200 kHz) MW 30 ± 4 dB (at 1,008 kHz)
<b>Selectivity:</b>	MW 35 ± 5 dB (at 1,008 kHz)
<b>IF response ratio:</b>	LW 32 ± 5 dB (at 200 kHz) MW 20 Hz to 2,500 Hz
<b>Frequency response:</b>	MW 51 ± 9 dB (at 1,008 kHz)
<b>Auto scan stop level:</b>	
<b>&lt; Amplifier section &gt;</b>	
<b>Power output:</b> (20Hz ~ 20 kHz, THD 0.5%)	20W + 20W
<b>Total harmonic distortion:</b> (20Hz ~ 20 kHz)	Less than 1.0%
<b>Power bandwidth:</b> (IHF, 10W, THD 1.0%)	10 Hz to 16,000 Hz
<b>Damping factor:</b>	More than 20 dB
<b>Separation:</b>	More than 35 dB (at 1 kHz)
<b>Cross talk:</b>	More than 60 dB
<b>S/N ratio:</b> (IHF-A curve)	More than 75 dB (PHONO) More than 80 dB ( )
<b>PHONO max. input:</b>	More than 120mV
<b>RIAA deviation:</b>	±0.7 dB (30 Hz to 15,000 Hz)
<b>Tone controls:</b>	BASS 100 Hz ±9 ± 2 dB TREBLE 10 kHz ±9 ± 2 dB
<b>Loudness response:</b> (Volume at -40 dB)	100 Hz +6 ± 2 dB 10 kHz +2 ± 1 dB
<b>Frequency response:</b>	40 Hz to 16,000 Hz ±1.5 dB
<b>Input terminals:</b> (Sensitivity/Impedance)	2.5 mV/47 kohms (PHONO) 150 mV/ 47 kohm (TUNER, AUX, TAPE)
<b>Output terminals:</b>	150 mV/3.3 kohm (TUNER, TAPE) 4 to 16 ohms (HEAD PHONES) 0.6 mW/1W (4 ohms) (SPEAKERS)

- The specifications and external appearance of this set are subject to change without prior notice.



WIRING-1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

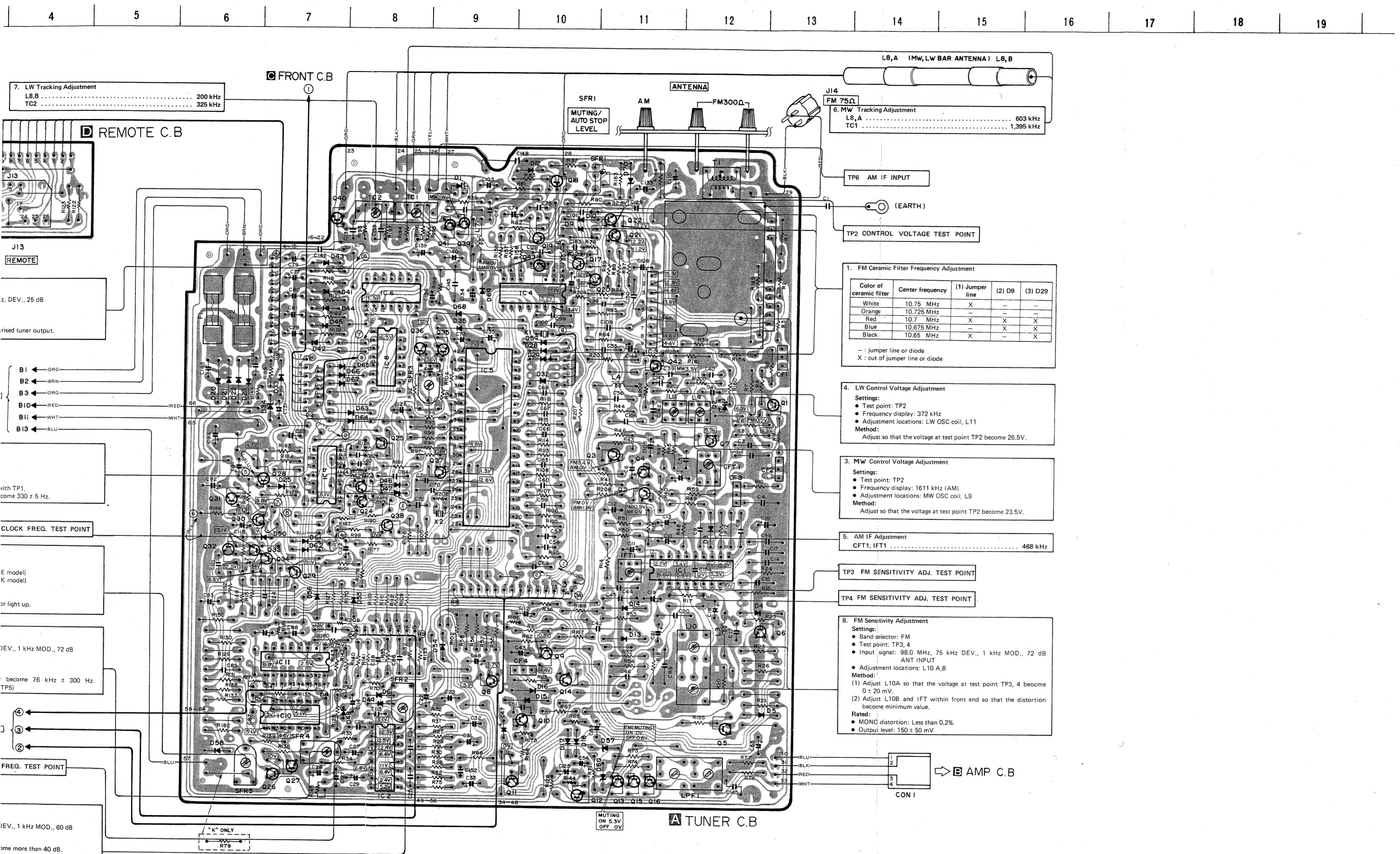


NOTES (1) B(+) Pattern ■ B(−) Pattern ■ Others pattern  
(2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.

C-MOS IC handling precautions

- The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care.
- Do not perform a continuity test with a tester, etc. Refer to the circuit voltages of each part.

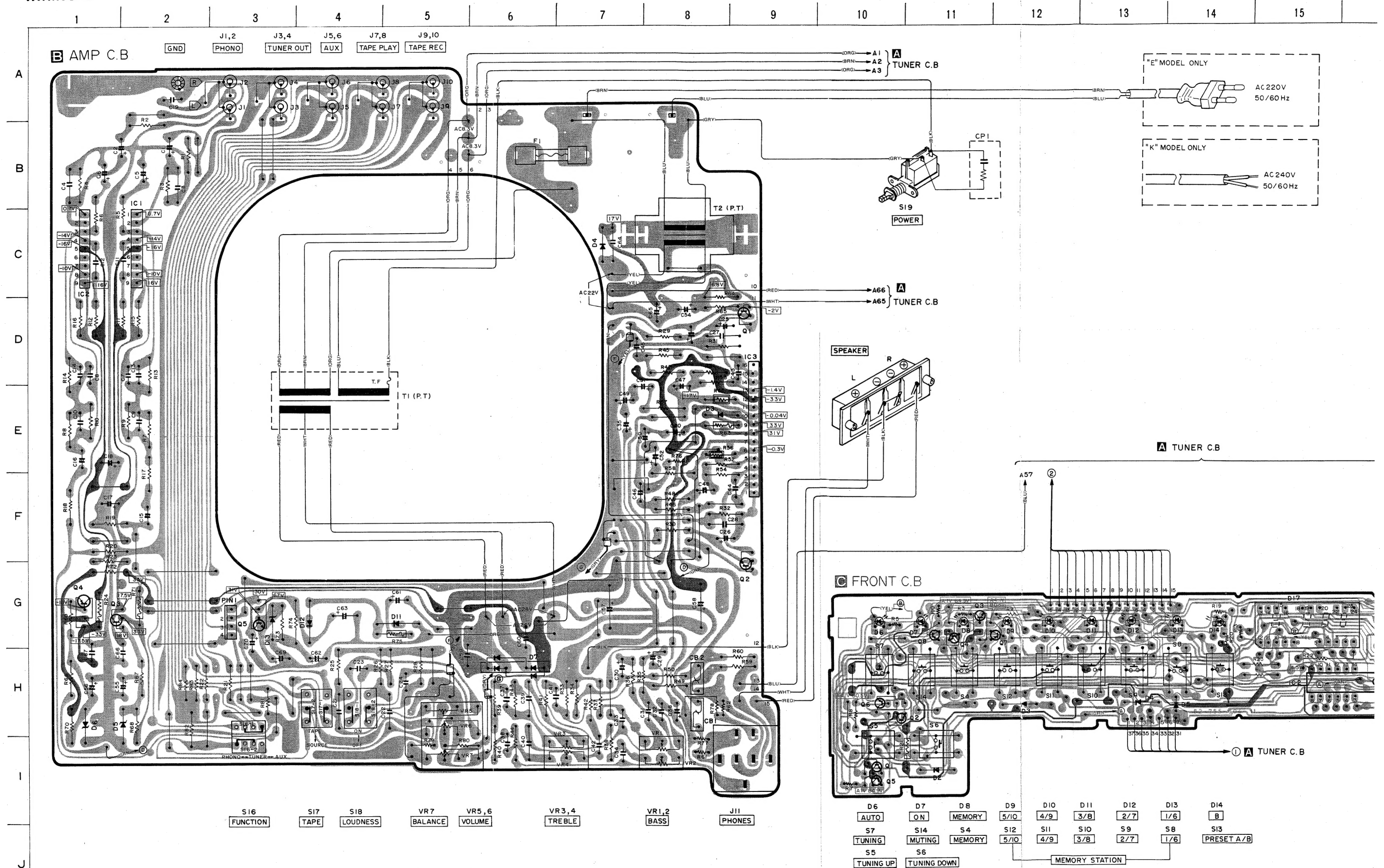


**C-MOS IC handling precautions**

- (1) The C-MOS IC's construction makes this part susceptible to damage by static electricity and so take sufficient care.
- (2) Do not perform a continuity test with a tester, etc. Refer to the circuit voltages of each part.

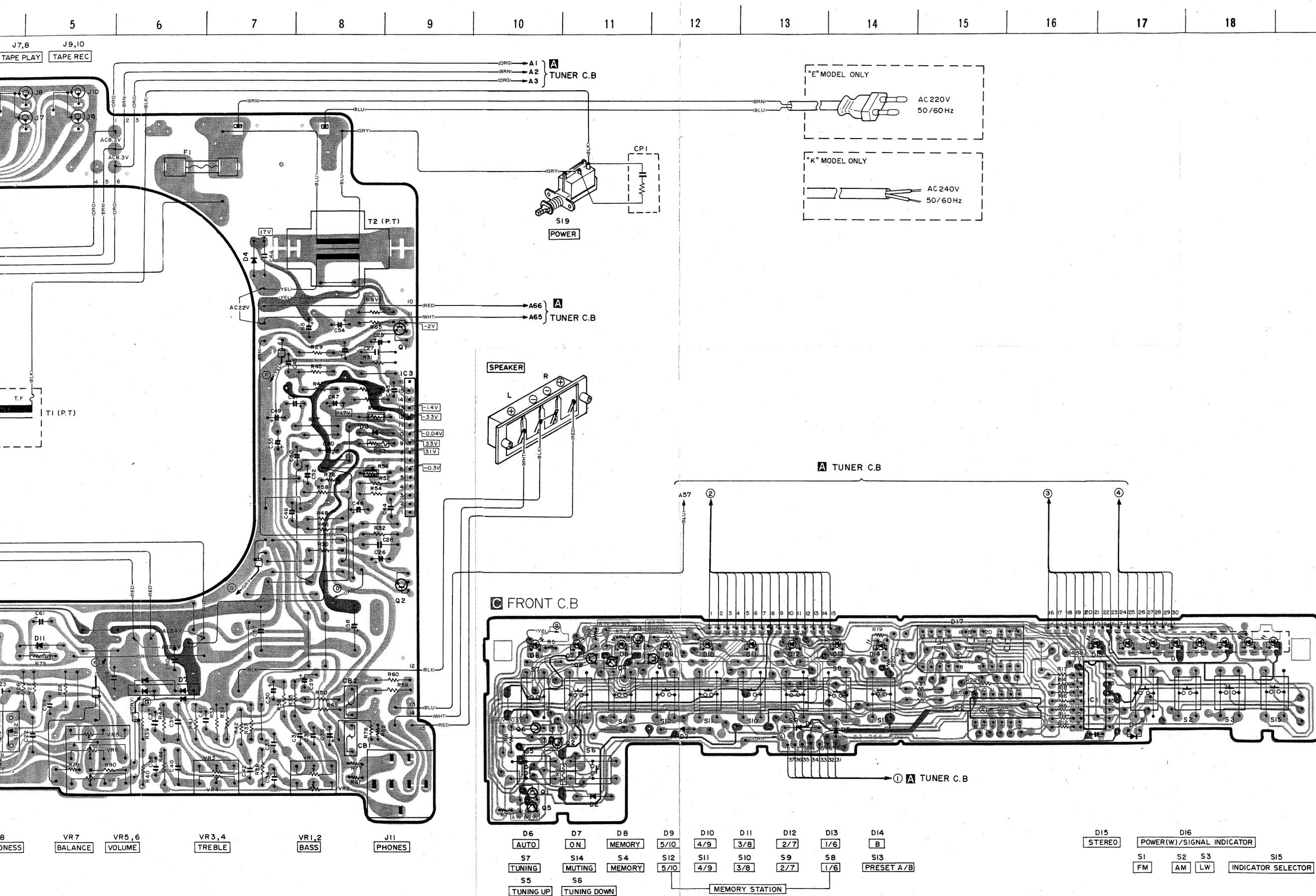


## WIRING-2






NOTES (1) B(+) Pattern Others pattern  
 (2) The voltage is the reference value measured with a tester (20 K ohms/V DC) when there are no signals.  
 But ( ) is with AM reception.

NOTES (1) B(+) Pattern Component side pattern Others pa





Others pattern  
reference value measured with a tester (20 K ohms/V DC) when there are no signals.  
AM reception.

**NOTES** (1)  B(+) Pattern  Component side pattern  Others pattern










## ELECTRICAL MAIN PARTS LIST

Symbol No.	Part No.	Description
« TUNER CIRCUIT BOARD SECTION »		
PCB-A	82-755-665-01	Tuner circuit board
CP1	82-755-610-01	Front end U
IC1	82-494-791-01	IC, HA11211
IC2	87-027-576-01	IC, HA12016
IC3	87-027-546-01	IC, TD6102 (P)
IC4	87-027-547-01	IC, TC9125 (P)
IC5	87-027-639-01	IC, TC9129 (P)
IC6,8,9	87-027-427-01	IC, MSM4016
IC10	87-027-668-01	IC, HD74LS73P
IC11	87-027-690-01	IC, IR2E02
Q1	89-319-233-01	Transistor, 2SC1923 (O)
Q2	89-110-154-01	Transistor, 2SA1015 (Y)
Q3,4,5,6, 8,9,10,11 12,14,17, 19,20,21, 22,23,24, 25,26,27, 28,31,33, 34,37,38, 39,41,43	89-318-154-01	Transistor, 2SC1815 (Y)
Q7	89-303-803-01	Transistor, 2SC380 (O)
Q13,29,35 36,40	89-318-155-01	Transistor, 2SC1815 (GR)
Q15,16	89-320-011-01	Transistor, 2SC2001 (K)
Q18	89-500-303-01	FET, 2SK30 (O)
Q30,32	89-408-804-01	Transistor, 2SD880 (Y)
Q42	89-318-156-01	Transistor 2SC1815 (BL)
D1,2	87-027-535-01	Diode, KV1226 (Y)
D3,4,5,6 9,10,12,17 18,25,28,29 32,35,41,42 43,44,45,46 47,48,49,52 54,55,56,59 61,62,63,64 65,66,67,68 69	87-027-097-01	Diode, 1S1555
D13,14,15, 16,33	88-052-188-11	Diode, 1S188 (FM)
D20,21,22 23,50	87-027-365-01	Diode, S5277 (B)
D34	87-027-552-01	Zener diode, HZ6B3L
D57	87-027-385-91	Zener diode, HZ11A3L
D60	87-027-393-01	Zener diode, HZ4C2
D70	87-027-375-01	Zener diode, HZ7C3L
L2	87-005-126-01	Choke coil, 1mH
L3,4,6,7	87-005-121-01	Choke coil, 2.2μH
L9	82-775-607-01	MW OSC coil
L10	82-742-641-01	Coil, Quad
L11	82-755-608-01	LW OSC coil
X1	82-742-676-01	Crystal, 9 MHz
X2	82-755-643-01	Ceramic resonator
LPF1	87-030-070-01	Low-pass filter
TC1	87-011-108-01	Trimmer, 8p
TC2	87-011-109-01	Trimmer, 15p
CF1	87-008-221-01	Ceramic filter HS 2GYHZ (E model only)
CF1	87-008-206-01	Ceramic filter FMMA8H (K model only)
CF2,3	87-008-206-01	FM ceramic filter FMMA8H

Symbol No.	Part No.	Description
CF4	87-008-217-01	FM ceramic filter, CFM2-468Z
CFT1	87-008-216-01	AM ceramic filter transformer CFMA-468
IFT1	87-008-160-01	AM IFT (DET)
T1	87-006-053-01	Balun
SFR1	87-021-557-01	Semi-fixed resistor, 10k $\Omega$ -B
SFR2	87-021-571-01	Semi-fixed resistor, 200k $\Omega$ -B
SFR3	87-021-573-01	Semi-fixed resistor, 3k $\Omega$ -B
SFR4	87-021-566-01	Semi-fixed resistor, 5k $\Omega$ -B
SFR5	87-021-567-01	Semi-fixed resistor 10k $\Omega$ -B (E model only)
SFR5	87-021-571-01	Semi-fixed resistor 20k $\Omega$ -B (K model only)
 F1,2	87-035-219-01	Fuse, "T" 500mA
	87-033-147-01	Fuse clamp
	82-755-606-01	Antenna terminal ass'y (ANTENNA) (E model only)
	82-755-613-01	Antenna terminal ass'y (ANTENNA) (K model only)
< Capacitors >		
C94	87-015-615-01	1000 $\mu$ F 25V Electrolytic
C56	87-015-566-01	0.47 $\mu$ F 16V Tantalun
C142	87-014-042-01	240PF PP
C41	87-014-048-01	430pF PP
C24,25,26	87-014-057-01	1000pF PP
C138	87-014-063-01	1800pF PP

#### ◀ AMP CIRCUIT BOARD SECTION ▶

PCB-B	82-755-648-21	Amp. circuit board
IC1,2	87-027-529-01	IC, TA7322P
IC3	87-027-658-01	IC, STK460
Q1,2,3	89-318-155-01	Transistor, 2SC1815 (GR)
Q4	89-110-155-01	Transistor, 2SA1015 (GR)
Q5	89-406-663-01	Transistor, 2SD666 (C)
D3	87-027-097-01	Diode, 1S1555
D4	87-027-365-01	Diode, S5277B
D5,6	87-027-347-01	Zener diode, HZ18-2L
D7	87-027-155-01	Encapsulated diode
D11,12	87-027-324-01	Diode, 1S1887
D13	87-027-661-01	Zener diode, H-30-2L
CB1,2	82-493-703-01	Circuit braker 2.5A (E model only)
CB1,2	87-030-077-01	Circuit braker, 2.2A(K model only)
J1~10	82-755-623-01	Jack plate ass'y
J11	87-049-011-01	Jack, 6.3 $\phi$ w/switch (PHONES)
VR1,2	87-021-638-01	Volume, 50k $\Omega$ -C (BASS)
VR3,4	87-021-637-01	Volume, 50k $\Omega$ -C (TREBLE)
VR5,6,7	87-021-636-01	Volume, 250k $\Omega$ -W, 100k $\Omega$ -Bx2 (VOLUME, BALANCE)
S16	87-031-585-01	Rotary switch (FUNCTION)
S17,18	87-031-584-01	Push-switch (TAPE, LOUDNESS)
PIN-1	87-032-904-01	Pin, 4P
 T2	82-755-653-01	Back-up power transformer
 F3	87-035-221-01	Fuse, "T" 800mA
	87-033-147-01	Fuse clamp
< Resistor >		
 R75	87-029-107-01	3.3 $\Omega$ 1/4w Fuse resistor
 R71,72	87-029-090-01	22 $\Omega$ 1/4w Fuse resistor
 R75	87-029-102-01	47 $\Omega$ 1/4w Fuse resistor
 R63	87-029-119-01	100 $\Omega$ 1/4w Fuse resistor
R23,24	87-025-311-01	220 $\Omega$ 1w Metal film
R74	87-025-213-01	1k $\Omega$ 1w Non flame (E model only)



Symbol No.	Part No.	Description
R74	87-025-176-01	2.2k $\Omega$ 1w Non flame (K model only)
R25,26	87-025-270-01	0.33 $\Omega$ 2w Cement resistor
< Capacitors >		
C1,2	87-015-242-01	2.2 $\mu$ F 50V Electrolytic LL
C45,46	87-015-387-01	2.2 $\mu$ F 50V Electrolytic BP LL
C15,16	87-015-507-01	4.7 $\mu$ F 16V Electrolytic BP LL








#### « FRONT CIRCUIT BOARD SECTION »


PCB-C	82-755-604-11	Front circuit board
IC1	87-027-590-01	IC, TC4511 (BP)
IC2	87-027-426-01	IC, IR2403
Q1,2,3,4	89-406-365-01	Transistor, 2SD636 (S)
Q5,6,7,8	89-206-415-01	Transistor, 2SB641 (S)
D1,2,3,4,5	87-027-219-01	Diode, MA150
D6,7,9,10 11,12,13	87-027-542-01	Light emitting diode, LN217RP (AUTO, ON, 5/10, 4/9, 3/8, 2/7, 1/6 INDICATOR)
D8	87-027-543-01	Light emitting diode, LN317GP (MEMORY INDICATOR)
D14	87-027-671-01	Light emitting diode, LN417YP (PRESET B INDICATOR)
D15	87-027-687-01	Light emitting diode, SR-505D (STEREO INDICATOR)
D16	82-553-603-01	Light emitting diode, LN07202 (P)
D17	87-027-670-01	Light emitting diode, LN543GK, E (FREQUENCY DISPLAY)
S1,2,3,4,5,6 7,8,9,10,11 12,13,14,15	87-031-498-01	Push-switch

#### « REMOTE CIRCUIT BOARD SECTION »

PCB-D	82-755-666-01	Remote circuit board
D24	87-027-097-01	Diode, 1S1555
J13	82-747-615-11	Connector ass'y (REMOTE)

#### « MISCELLANEOUS »

 T1	82-755-618-01	Power transformer (E model only)
 T1	82-755-650-01	Power transformer (K model only)
L8	82-755-615-01	MW/LW bar antenna
J12	82-755-627-01	DC jack
	82-755-677-01	Speaker terminal
 S19	87-031-467-01	Push-switch (POWER)
	87-034-877-01	AC power cord (E model only)
	87-034-872-01	AC power cord (K model only)
	87-085-180-01	Cord bushing
	87-085-166-01	Holder, AC power cord
CON-1	82-755-635-01	Connector ass'y, 4P
	82-304-743-01	1P, Terminal
	82-755-656-01	Core ring E,K
< Capacitors >		
 C1	87-019-104-01	0.01 $\mu$ F PP

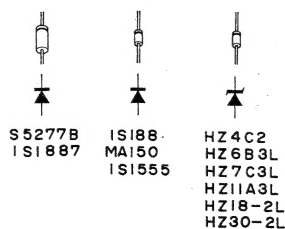
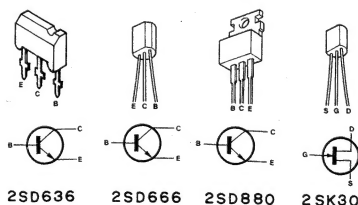
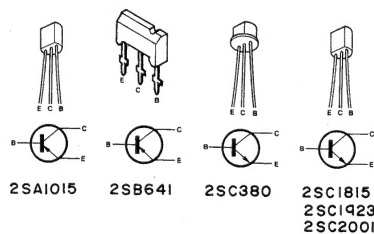
 This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.





## NOTES:

- 1) — B (+) power supply — B (-) power supply
  - 2) → Signal path  
⇒ Rec path, AM signal path.
  - 3) The voltage is the reference value measured with a tester (20 k-ohms/V DC) when there are no signals. But ( ) is with AM reception or recording. An asterisk (\*) indicates that the value was measured with a vacuum-tube voltmeter during recording.
  - 4) Resistors with no designation have a rated power of 1/4W and a tolerance of ±5%.
  - 5) Capacitors with no designation have a dielectric strength of less than 50WV.
  - 6) The only capacitor tolerances indicated are ±5% (J) and ±10% (K).
  - 7) Ceramic capacitor symbols:  
 For temperature compensation (SL)  
 High dielectric constant system (YY)  
 High dielectric constant system (YW, YP, YZ)  
 Semiconductor ceramic  
 For temperature compensation (SH)
  - 8) Explanation of symbols  
 Mylar capacitor  
 Aluminum solid capacitor  
 Polypropylene film capacitor  
 Bi-polarized capacitor  
 Low-leakage capacitor  
 Tantalum capacitor  
 Safety component symbol
- ⚠ This symbol is given to important parts which serve to maintain the safety of the product, and which are made to conform to special safety specifications. Therefore, when replacing a component with this symbol, make absolutely sure that you use a designated part.
- This schematic diagram is subject to change without notice in the interests of improved performance.



## PARTS LIST

## MECHANICAL PARTS

■ \* mark in this part list shows exclusive part  
(which is used) for only Model No. AX-S50.

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1-1	09-047-186-01		Front panel ass'y	*	1
	82-755-002-01		Front panel U	*	1
	82-747-003-01		Window	ST-R50	1
	82-747-009-01		Guide E	ST-R50	1
	82-745-011-01		Guide, Push-button B		1
	82-755-024-01		Decorative plate, Balance knob	*	1
	82-745-014-01		Decorative plate, Knob		2
	82-745-012-01		Guide, Push-button C		1
	82-755-006-01		Guide	*	1
	82-755-003-01		Guide	*	1
	82-747-006-01		Push-key E	ST-R50	2
	82-747-206-01		Leaf plate spring B	ST-R50	1
	82-755-016-01		Push-key G	*	11
	82-755-025-01		Push-key (Tank G)	*	2
	82-755-210-01		Plate spring	*	3
	82-755-211-01		Plate spring I	*	1
1-2	82-755-223-01		S-cushion, Display	*	1
1-3	82-751-002-01		Knob, Balance	SA-C30	1
1-4	82-751-001-01		Knob, Volume	SA-C30	1
1-5	82-751-013-01		Knob	SA-C30	2
1-6	82-753-006-01		Knob, Selector		1
1-7	82-755-005-01		Display E	*	1
1-8	82-755-201-01		Chassis, Front	*	1
1-9	82-745-009-01		Push-button B		2
1-10	82-745-010-01		Push-button C		1
1-11	82-755-207-01		Chassis Tuner	*	1
1-12	82-745-003-01		Side panel L		2
1-13	82-755-204-01		Amp. chassis E ass'y	*	1
1-14	82-745-019-01		Foot		4
1-15	82-755-601-01		Heatsink A	*	1
1-16	82-758-601-01		Heatsink C		1
1-17	82-731-204-01		Holder, IC		1
1-18	82-755-217-01		Insulation sheet E	*	1
1-19	82-755-602-01		Heatsink B	*	1
1-20	87-064-080-01		Wire binder		2
1-21a	82-755-010-01		Jack plate E (E model only)	*	1
1-21b	82-755-026-01		Jack plate K (K model only)	*	1
1-22	87-085-090-01		Nylon rivet		1
1-23a	87-034-877-01		AC power cord (E model only)		1
1-23b	87-034-872-01		AC power cord (K model only)		1
1-24	87-084-063-01		Nylon rivet		4
1-25	87-085-180-01		Cord bushing		1
1-26	82-747-209-01		Spacer, Counter	ST-R50	1
1-27	82-756-657-01		Shield plate	*	1
1-28	82-755-208-01		Antenna holder ass'y	*	1
1-29	82-755-642-01		Bar antenna D	*	1
1-30	82-755-008-01		Cabinet, steel	*	1
1-31	82-755-220-01		Insulation sheet A	*	1
1-32	82-439-226-01		Collar, FR slide plate	TPR-300	1
1-33	87-063-113-01		Cushion WA		1
1-34	82-755-221-01		G cushion	*	4
1-35	87-085-166-01		Holder, AC power cord		1
1-36a	82-755-012-01		Name plate, Spec. (E model only)	*	1
1-36b	82-755-012-01		Name plate, Spec. (K model only)	*	1



## ACCESSORIES/PACKAGE

Ref. No.	Part No.	Part No. Changed to	Description	Common Model	Q'ty
1	82-755-853-01		Printed indiv., Packing	*	1
2	82-747-853-21		Cushion L, Printed indiv.	ST-R50	1
3	82-747-854-21		Cushion R, Printed indiv.	ST-R50	1
4	87-051-135-11		Poly-vinyl sack (for AC power cord)		1
5	87-056-604-01		Poly-vinyl sack (for case)		1
6a	82-755-907-01		Instructions booklet (E model only)	*	1
6b	82-755-908-01		Instructions booklet (K model only)	*	1
7	87-051-171-11		Poly-vinyl sack		1
8	87-056-009-01		Distributors list		1
9	87-043-051-01		FM feeder antenna		1

# AIWACO.,LTD.